



**To:** Distribution: LTP Community  
**From:** Steve Irick  
**Date:** 11 October, 2000  
**Re:** LTP intensity data format change

The ALS Optical Metrology Lab (OML) is using a different format for the Long Trace Profiler (LTP) intensity data files. As explained in a previous memo for a suggested format<sup>1</sup>, each file consists of a header and a data section. Terminology is also explained in this memo. The data section is not changed, but the header is changed in order to accommodate more needed information about the measurement conditions and to be more consistent with LTP II instrument formats in general.

An example of this new format is on the next page. Each blank line is indicated by the line number with subscript size. Comments only for this document have subscript size and are placed at the extreme right of the line. The ALS OML program (LTPw) makes extensive use of string parsing functions that assign more than one data on one line to their respective variables. LTPw now reads this new intensity data format, but not the older ALS format. Intensity data files are considered a temporary medium and are overwritten in each directory (folder). Therefore, there is no effort to reread or reformat older intensity data files. The last two pages give a more general format scheme which should eliminate any ambiguity in the example.

The surface data files are also being changed. The memo which describes this new file format will be of interest to a wider audience<sup>2</sup>. Much of the data now being recorded in this new intensity data format are passed on as surface properties.

## References

1. "LTP Measurement Scan Conventions," Memo to the LTP Community at Large; 18 January, 1994.
2. "LTP surface data format change," Memo to the LTP Community at Large; 24 October, 2000.

# LTPw Intensity Data Archive Example

LTPw ALS\_28Sep00  
Intensity data  
cvr8.int  
Monday, 2 Oct 2000; 17:10:12

5  
Number of pictures: 361  
Intensity patterns: 1,1

8  
9  
10  
Step size: 1.000000  
X unit: mm  
Z unit:

14  
15  
16  
17  
18  
19  
20  
Focal length: 1250.000000  
Optical mult: 1.060310  
Wavelength: 0.000670  
Temperatures: available  
Scan type: MEAS  
X resolution: 0.0006328  
Margin,speed or Margin: 10.000000,3.000000  
Camera type: Cronin dual opposed array, EPP  
NrArraysCamera: 2  
NrPixelsArray: 1024  
NrBitsPixel: 16  
Array length: 25.000000  
Array width: 2.500000  
Array center spacing: 0.000000  
Camera clock time: 0.000016  
MinIntegrTime: 0.000030

37  
38  
39  
\*Data starts.  
0.098000 21.57  
1024 0  
93  
107

.  
.  
132  
1024 0  
141  
128

.  
.

Instrument type and file format version

This file's filename

Creation date, time

Comment line if not blank

Nr intensity patterns per frame, each frame

Intended dx or dt

[mm] or [s]

of the LTP optical system

AKA calibration factor

of the probe beam source

[° C] as the 2nd X argument

MEAS (vs x) or STAB (vs t)

scan resolution [mm] or [s]

[mm],[mm/s] if MEAS; [s] if STAB

Camera title

Number of arrays in the camera

Number of pixels in each array

Dynamic resolution (log base 2)

[mm]

[mm]

[mm]

[s]

[s]

Last line of the header

First x or t value; maybe temperature

NrIntsy data 1st frame, 1st pixel position

First intensity value 1st frame

Second intensity value 1st frame

Last intensity value 1st frame

NrIntsy data 2nd frame, 1st pixel position

First intensity value 2nd frame

Second intensity value 2nd frame

# LTPw Intensity Data Archiving Format

<u>category</u>	<u>line number</u>	<u>contents</u>
header	1	“LTPw ”, file format version
	2	“Intensity data”
	3	This file’s filename
	4	This file’s date & time
	5	comment
	6	number of pictures (n)
	7	nip[0], nip[1], ... , nip[m-1]
	8	
	9	
	10	
	11	dx or dt
	12	x units
	13	intensity units
		...
	21	nominal lens focal length [mm]
	22	multiplier (calibration factor)
	23	source wavelength [nm]
	24	temperature: initial, final [°C]
	25	scan type
	26	resolution (position or time)
	27	margin and speed
	28	DetType: Title
	29	DetType: NrArraysCamera
	30	DetType: NrPixelsArray
	31	DetType: NrBitsPixel
	32	DetType: ArrayLength
	33	DetType: ArrayWidth
	34	DetType: ArraySpacing
	35	DetType: ClockTime
	36	DetType: MinIntegrTime
	37	
	38	
	39	
	40	“*Data starts.”

key: id= intensity datum, ip= intensity pattern, sp= starting pixel, np= number of pixels,  
nip= number of intensity patterns, n= number of pictures, m= number of frames.  
T[i] is the temperature for the ith picture, and is here if available.

Note that there can be any number of ip in one frame. However, the same number of ip is always in each ith frame for every picture. This is defined in line 7.

<u>category</u>		<u>line number</u>	<u>contents</u>
data	picture[0]	frame[0]	41      x[0] T[0]
			42      np, sp
			43      id[0][sp]
			44      id[0][sp+1]
			45      id[0][sp+2]
		...	...
		42+np	id[0][sp+np-1]
		frame[1]	np, sp
			id[1][sp]
			id[1][sp+1]
			...
			id[1][sp+np-1]
		...	...
		frame[m-1]	np, sp
			id[m-1][sp]
			id[m-1][sp+1]
			...
			id[m-1][sp+np-1]
	picture[1]	frame[0]	x[1] T[1]
		frame[1]	
		...	...
		frame[m-1]	
	...	...	...
	picture[n-1]	frame[0]	x[n-1] T[n-1]
		frame[1]	
		...	...
		frame[m-1]	